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**PhD in Global Health**

Metrics Track

# Whatever this doc is about

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# 1 Introduction

It is quite easy to make hyperlinks in LaTeX and to manage the bibliogrpahy [1, 2].

And we can also embed our R code inside the doc for easier use.

# 2 Embed R code ?!!

## 2.1 Basic test

```
aa <- rnorm(100000)
mean(aa)

## [1] 0.0006293965
```

and we can then get the results inside the text with `\Sexpr{mean(aa)}` which gives us $6.2939653 \times 10^{-4}$

And it also handles nicely integration of plots in Latex with label for future reference in the text. Exemple with figure 1. Still have to manage the position of figures (in the header of code chunks).

```
aa <- rnorm(100000)
hist(aa)
```

```
mean(aa)

## [1] 0.004705424
```

Useful to keep in mind :
**fig.lp**:

## 2.2 Trying out equations

We first write equation (7.52) and use the approximation provided in the exercise :

$$\mathrm{GCV}(\hat{f}) = \frac{1}{N}\sum_{i=1}^{N}\left[\frac{y_i - \hat{f}(x_i)}{1 - S_{ii}/N}\right]^2 \tag{1}$$

$$\approx \frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2 \tag{2}$$

$$= \frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2 + 2\frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2\frac{S_{ii}}{N} \tag{3}$$

Using $\frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2$ as an approximation of $\sigma^2$ and $S_{ii} = d$, we can then rewrite this as

$$\frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2 + 2\frac{1}{N}\sum_{i=1}^{N}[y_i - \hat{f}(x_i)]^2\frac{S_{ii}}{N} \approx \sigma^2 + 2\sigma^2\frac{d}{N} \tag{4}$$

This is equivalent to equation (7.26), only difference being how we estimate $\sigma^2$.

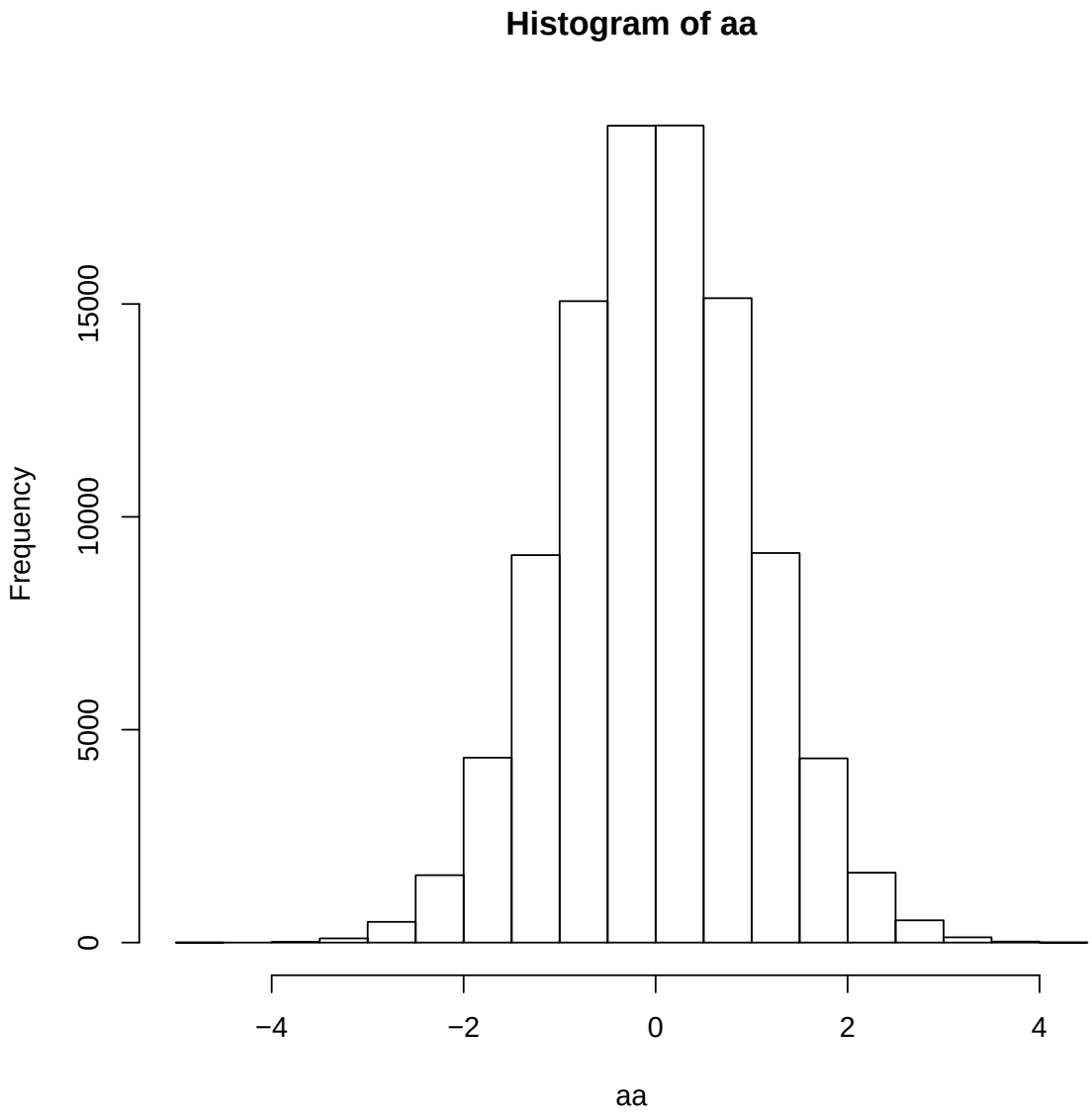


Figure 1: A nice caption and label for future reference

## References

[1] LaTeX Project. LaTeX – a document preparation system, 2010. URL http://www.latex-project.org/.

[2] Wikipedia. LaTeX, 2011. URL http://fr.wikipedia.org/wiki/LaTeX.